DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 30, 2011 has been entered. New claims 30-41 are pending and under examination.

Response to Amendment

2. The following rejections are withdrawn:

The rejection of claims 1, 2, 6-14, 16-18, 20-22 and 25-29 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8, 12-19, and 23-31 of U.S. Patent No. 7,198,934, or of claims 1-5, 8-11, 16-19, 24-28, 31, and 33 of US Patent 6,440,422; in view of the teachings of Schneider et al., Yang et al., Kumar et al., Bujard et al., and Sedegah et al, is withdrawn upon further consideration.

The provisional rejection of claims 17 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10 and 21-24 of copending Application No. 12/523,023 in view of in view of the teachings of Schneider et al., Yang et al., Kumar et al., Bujard et al., and Sedegah et al., is withdrawn upon further consideration.

Specification

3. The objection to the specification for failing to provide proper antecedent basis for the claimed subject matter, with respect to the phrase, "wherein the vaccine does not comprise an adjuvant" is withdrawn in view of Applicant's amendment to the specification. However, the disclosure is newly objected to because of the following informality:

The amendment filed March 30, 2011 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Paragraph [0070] of the substitute specification has been amended to include the following sentence:

> Administration of the vaccine in the prophylaxis and/or therapy of malaria according to the instant disclosure does not require a DNA prime or a DNA booster.

It does not appear that the specification contemplated a DNA prime or boost such that it can now be excluded. Applicant is required to cancel the new matter in the reply to this Office Action.

Claims Summary

4. The claims are drawn to a virus, a vaccine comprising the virus, a kit comprising the vaccine, and a method of therapy using the vaccine. The virus as claimed in claims 40 and 41 is recombinant MVA virus comprising a nucleic acid sequence coding for Plasmodium falciparum merozoite surface protein-1 (MSP-1) fragments p42 and p38, or fragments p83, p30, p42 and p38. Claims 40-41 encompass fragments of (i.e., regions within) p42 and p38, given the claim language. If this is not the intent of Applicant, then it is suggested that the term "p42 and p38 fragments", for example, be amended to recite "p42 and p38".

The vaccine and kit embodiments (claims 30-34 and 37-39) comprising a pharmacologically compatible/acceptable carrier and a recombinant MVA virus comprising a nucleic acid sequence coding for Plasmodium falciparum merozoite surface protein-1 (MSP-1) fragments p42 and p38, or fragments p83, p30, p42 and p38. The vaccine and kit further comprise MSP-1 protein (understood to be a full-length, intact MSP-1 protein) or a fragment thereof. Specifically, the nucleic acid sequence is under the control of a promoter. The 5' end of the nucleic acid sequence comprises a coding sequence for a signal peptide sequence, which controls the secretion and/or localization of the MSP-1 fragment. In another embodiment, the signal peptide sequence controls the GPI anchoring of the MSP-1 fragment.

In one embodiment, the vaccine does not comprise an adjuvant. The vaccine kit components are suitable for simultaneous, sequential or separate administration along with the recombinant virus. Also claimed is a method for the therapy of malaria, comprising administering the vaccine described above. In another embodiment, the method does not comprise administering a DNA prime or a DNA booster

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Claim Objections

5. Claim 37 is objected to because of the following informalities: Line 6 contains an extra "and". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 36 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is new matter rejection.

The claim recites, "wherein the method does not comprise administering a DNA prime or a DNA booster". It does not appear that the specification contemplated a DNA prime or boost such that it can now be excluded.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 30-32 and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the teachings of Mayr (WO 01/68820 A1, "Mayr") in view of Pan et al. (Nucleic Acids Research, 1999, 27(4):1094-1103, "Pan"). (Note that the Pan reference attached to this document is a website printout of 19 pages, but contains the same content as pages 1094-1113. The examiner was not able to attach a legible copy of the pdf from the journal's website.) The claims are summarized above. Mayr discloses MVA vectors that express vaccine components for immunization (see abstract). The MVA vectors contain at least one heterologous nucleic acid

sequences encoding an immunizing protein against malaria (e.g., Plasmodium falciparum) under the control of a vaccinia virus promoter (see page 7, third full paragraph, and page 8, first full paragraph). Also taught is a method of treating or immunizing using the vaccines. Regarding the limitation of claims that no adjuvant is present in the vaccine and no DNA prime/boost with the method of therapy, Mayr does not teach or suggest using an adjuvant with the MVA vectors. While Mayr teaches that the MVA vectors may themselves be used as adjuvants, their use is not restricted to such, nor is there a teaching or suggestion that the MVA vectors be administered with an adjuvant or a DNA prime/boost.

Mayr does not specifically point out which Plasmodium falciparum antigens are to be expressed from the MVA vectors. Mayr's teachings are general with respect to the antigen and specific with regard to the vectors themselves. Therefore, it would have been obvious for the ordinary artisan to have selected an antigen(s) that is of interest, immunologically-speaking. Pan discloses MSP-1 from Plasmodium falciparum and the production of full-length MSP-1 and fragments p83, p30, p38, p42 and p19 (see page 1096, top of first column, or page 4 of the website printout, middle of the page). Pan teaches that MSP-1 is highly immunogenic in humans (see abstract and page 1095, first column, first full paragraph, or pages 2-3, bridging paragraph of the website printout). In view of the fact that the MSP-1 protein is of immunological interest, along with its fragments, one would have been motivated to introduce MSP-1 fragments into Mayr's vectors for expression. As to the particular combination of p42 and p38, or p83, p30, p42 and p38, it would have been obvious to try any combination of known fragments given the finite number of identified, predictable solutions (i.e., p42, p83, p30, p42 and p38) with a reasonable

expectation of success (i.e., Pan teaches that MSP-1 is immunogenic, and Mayr suggests expressing Plasmodium falciparum antigens).

Although Mayr does not mention the use of a pharmacologically acceptable/compatible carrier for the MVA vectors, one would expect that there must be some type of carrier for the MVA vectors to maintain their integrity. Given that the MVA vectors are useful as vaccines for both animal and human use, one would have used a pharmacologically acceptable/compatible carrier (see Mayr, page 8, last paragraph). Further, although Mayr does not use the term "kit", the components of the vaccine kit (claims 37-39) are the same as those of the vaccine composition. Thus, despite the name "kit", the limitations of the kit claims have been met. As for the components being suitable for simultaneous, sequential or separate administration, there is no reason to doubt that the administration of Mayr's MVA vectors and additional MSP-1 antigen would not be suitable for administration is any desired order. Mayr teaches that the MVA vectors are suitable for use as adjuvant to co-stimulate the immune response against the antigenic determinant of a vaccine, in this case, MSP-1 and fragments thereof (see page 9, first paragraph). Therefore, the claimed embodiments would have been obvious to one of ordinary skill in the art at the time the invention was made.

8. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the teachings of Mayr (WO 01/68820 A1, "Mayr") in view of Pan et al. (Nucleic Acids Research, 1999, 27(4):1094-1103, "Pan"), as applied to claim 30 above, and further in view of Yang et al. (Vaccine, 1997, 15(12/13):1303-1313). Claims 33 and 34 are directed to embodiments where the

nucleotide sequence in the MVA vector comprises at its 5' end a coding sequence for a signal peptide sequence that controls secretion, localization or GPI anchoring of the MSP-1 fragments.

Although Mayr does not teach the inclusion of such sequences, Yang teaches that the inclusion of such signal sequences in vaccinia vectors encoding the MSP-1 antigens of the reference resulted in the surface expression of the antigens on the infected cells, which resulted in an enhanced response against the antigens. Thus, it would have been obvious to those of ordinary skill in the art to have used this technique with a reasonable expectation of success to enhance the immunogenicity of the antigens encoded by the MVA vectors of Mayr. Therefore, the claimed embodiments would have been obvious to one of ordinary skill in the art at the time the invention was made.

Conclusion

9. No claims are allowed.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STACY CHEN whose telephone number is (571)272-0896. The examiner can normally be reached on M-F (7:00-4:30), alternate Fridays off. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zachariah Lucas can be reached on 571-272-0905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Stacy B Chen/
Primary Examiner, Art Unit 1648